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⑳ Aerosol container cap.

㉑ A cap comprising of a cover (2) and a tubular body (1) for use on a aerosol can (5). The tubular body (1), fitted onto the aerosol can (5), contains a perpendicular bar (10), horizontal bar (6), ducts (30) to release the contents on the can. To activate the ejection valve stem (14), a lever mechanism is incorporated in the cover which can be disposed in an open and close position. In the open position, the upper portion of the cover (26) depressed, activates the ejection valve stem (14), releasing the contents. When upper portion of cover is moved to a close position, it is not possible to accidentally activate the ejection valve stem. Audible sound is created when the cover reaches the open and close position.

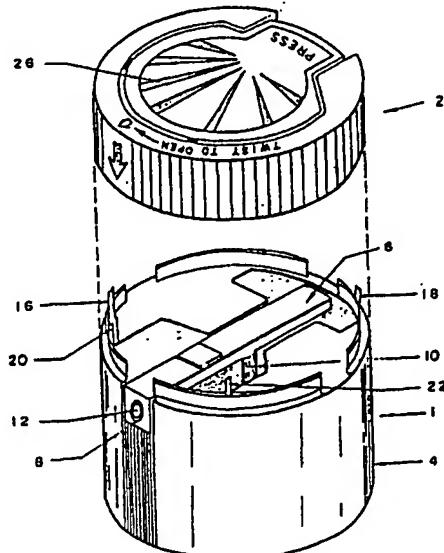


FIG. 1

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## AEROSOL CONTAINER CAP

### FIELD OF INVENTION

This invention relates to an aerosol container cap and more specifically, to certain new and useful improvements in the configuration and structure of an aerosol container cap for use in association with an aerosol container discharge gaseous or vapourised matter.

Aerosol containers containing a wide variety of active components such as insect repellents, insecticides, hair sprays, creams or foams and so on have been marketed widely for household, commercial or industrial purposes.

In conventional aerosol container, the ejection outlet is normally a tubular element which, when depressed into the body of the container releases the contents which are held under pressure. When the applied force at the valve stem is removed, the valve stem returns to its equilibrium position simultaneously stopping the outward flow of the contents of the container. In one type of aerosol containers a small knob (actuator) is fitted over the valve stem such that when the actuator is depressed the valve stem is simultaneously depressed causing the contents of the container to be released via an outlet in the actuator. Release of the pressure at the actuator returns the valve stem to its equilibrium position. Very often the contents of the aerosol container spill over onto the finger of the operator. To operate the actuator an enclosing cover has to be removed first to expose the actuator. Such covers can often be misplaced by the end-users.

In another type of aerosol container cap, the cap is designed with the actuator as part of its total structure whereby the release of the contents is done by depressing a certain part of the cap (trigger). The contents of the aerosol goes through a certain part of the cap. This is called a "spray through cap". However, in this type of cap the "trigger" is not protected from accidental pressing of the cap by the user. Although in this type of cap, the hand is not soiled by the spillage of the aerosol contents, the danger or inconvenience of accidental spraying of the contents is present.

### OBJECTS OF THE INVENTION

It is therefore an object of the present invention to provide an aerosol container cap which can obviate the above described problems inherent in the conventional aerosol caps.

It is another object of the present invention to provide an aerosol container cap wherein the cap

can be positioned in an operate or seal position analogous to an on and off position.

It is another object of the present invention to provide an aerosol container cap wherein the operate or seal position is easily attained by simple basic movements by the user.

It is still another object of the present invention to provide an aerosol container cap wherein the operate and seal position of the cap is easily identified by any user.

It is further object of the present invention to provide an aerosol container cap wherein the contents of the container do not come into physical contact with the hands of the user when the cap is used.

It is still another object of the present invention to provide an aerosol container cap wherein an audible sound indicator is provided to indicate when the cap is either in the operating or seal position.

### SUMMARY OF THE INVENTION

25 An aerosol container cap comprising a tubular body and a cover member; the tubular body being mounted over the ejection valve stem of the aerosol container and having a diametrically positioned first bar pivoted at one end to the circumferential edge of the tubular body and a second bar connected to the said first bar positioned and dimensioned to fit over the valve stem and the said two bars having a continuous passage therethrough designed to permit flow of the aerosol contents into an aperture on the second bar and out through the pivoted end of the first bar; and a cover member mounted revolvably over the tubular body wherein the cover member includes a resilient means for engaging on the free end of the first bar in an operating and seal position.

30 In one aspect of the invention the resilient means of the cover member includes depressable portion pivotally mounted or hinged at one end to the cover member and an actuator means on the underside at the free or loose end of the said depressable portion to engage on the free end of the first bar in an operating position and disengage from the free end of the first bar in a seal position.

35 In another aspect of the invention the tubular body is provided with at least two stoppers spaced a distance apart and the cover member includes a reciprocal stopper means so as to restrict the radial movement of the cover member on the tubular body within a pre-determined radial angle.

40 It is still another aspect of the invention when

the first of the two stoppers and the reciprocal stopper means are in contact, the actuator means on the cover member is in an engaged position on the free end of the first bar; and when the second of two stoppers and the reciprocal stopper means are in contact, the said actuator is in a disengaged position from the said free end of the first bar. The reciprocal stopper means includes an inward projecting lip from the circumferential edge of the cover member adjacent to the free end of the said depressable portion.

In yet another aspect of the invention an audible means is included to provide an audible signal to the user indicating the moment the cap is ready for operating and the moment the cap is in a sealed condition. The said audible means comprises of two rigid flap projections integral with the tubular body and spaced apart on the circumferential edge of the tubular body and a corresponding rigid flap integral with the cover member projecting on the underside of the inner circumferential edge of the cover member, all flaps so dimensioned such that when the flap on the cover member passes over the flap on the tubular body at the moment the cap is ready for operating (open position) or sealed condition (close position) respectively, an audible sound is produced by the frictional force.

The cap body including all the various components parts is advantageously formed in a plastics composition.

In addition, the circumferential side surfaces of the cover member and tubular body are flushed when in position, thus resulting in a continuous smooth surface.

The invention will now be further described by way of example only with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of the cap body (with the cover member and the tubular body apart) according to the invention.

Figure 2 is a plan view of the tubular body (lower cap) according to the invention.

Figure 2A is an underside plan view of the tubular body according to the invention.

Figure 3 is an underside plan view of the cover member (under cap).

Figure 4 is a perspective view of the inside of the cover member (upper cap).

Figure 5 is a across-section on the line X-X in Figure 1 (the position of the valve stem and the top portion of the aerosol can are included for purpose of clarity).

The illustrated cap body includes a tubular body (1) and a cover member (2). The tubular body (1) comprises a cylindrical body (4) the lower end of which is of conventional design to fit tightly over the top end of the aerosol can (5). The upper

end of the tubular body includes a diametrically positioned T-shaped member comprising of a horizontal first bar (6) and a second bar (10). The first bar is securely pivoted or hinged at one end to the circumferential surface (8) of the tubular body. The second bar (10) is preferably integrally connected to the first bar and is so dimensioned to fit over the valve stem (14) of the aerosol can (5) in a loose fitting manner. The said second bar is hollow and the free end of which is an inserted funnel shape to accommodate the valve stem of the aerosol can. One portion of the first bar (6) and the second bar (10) includes a continuous passage (30) therethrough to permit the flow of the aerosol contents. When the valve stem is depressed, the contents of aerosol can stored under pressure are released. The said released contents are channelled through the aforesaid passage in the first and second bar to leave the passage via the orifice opening (12) at the pivotal end (8) of the first bar. By way of example only, household insecticides are one such material packed in aerosol container. When the valve stem is depressed, the insecticide is ejected out from the aerosol container. The ejected repellent is discharged through the orifice in a conical spray.

The valve stem is depressed preferably by depressing the second bar (10) by leverage means. This is achieved by depressing the free end (6a) of the first bar hereinafter to be described.

The tubular body includes a tongue and groove means (16) at the upper peripheral edge consistent with the tongue and groove means of the cover member. It is preferred that the tongue and groove means of the cover member be positioned on lower inner side of the cover member which configuration and design results in a smooth flushed surface when the cover member is fastened to the tubular body. The cover member (2) is snap fastened to the upper portion of the tubular body by means of the complimentary tongue and groove means. It will be understood by those skilled in the art that are other acceptable ways in which the cover member can be rotatably fastened to the tubular body.

It is a preferred embodiment of the present invention that the circular movement of the cover member in relation to the tubular body be restricted to a predetermined radial angle corresponding to the operating and sealed position of the cover member (analogous to the open and close position). This is achieved in the preferred embodiment by the positioning two stoppers (16, 18) along the peripheral edge of the tubular body, one on each side of the first bar (6). In Figure 1 the said stoppers are positioned at the 1 o'clock and 7 o'clock positions relative to the direction of the first bar. The said stoppers (16, 18) act in a reciprocal

manner with the lip (32) of the cover member in a manner to be hereinafter described.

To indicate to the user the operating and seal position of the cap there is provided an audible means which produces an audible sound when the cover is moved to the operating position and when the cover is moved to the seal position when rotated. In the present embodiment two rigid flap projections (20, 22) are positioned, one on each side of the first bar (6) along the inner peripheral edge and adjacent to the tongue and groove means of the tubular body, preferably at 1 o'clock and 11 o'clock positions respectively relative to the direction of the first bar (6). The cover member (2) includes a underside fin (24) projecting on the underside of the inner circumferential edge. When the cover member is fastened to the tubular body, the underside fin (24) lies between the two rigid flaps (20, 22).

The fin (24) passes over the flap (20) when the cover member is in a sealed position (closed position). When the cover is rotated to an operating position (open) the fin (24) now passes over the flap (22). Whenever the fin glides over the flaps an audible "click" sound is heard indicating the respective positions of the cover member.

The tubular body preferably further includes two shelf-like portions (23a, 23b) on either side of the first bar (6) substantially at the same level as the upper surface of the first bar. These shelf-like portions provide support and maintain the shape of the tubular body and also act as a opposing structure to the depressable portion of the cover member when the cap is in the sealed position.

The cover member includes a depressable portion (26) substantially made out of the top surface of the cover. The depressable portion is pivoted or hinged at at least one end. In the preferred embodiment the depressable portion is hinged at two points (31a, 31b). Alternatively, one large hinge can be provided to accomplish the same purpose. The depressable portion is resiliently malleable at the hinges such that after the downward force is removed, the depressable portion returns to its original equilibrium position. The free end of the depressable portion (26a) has an actuator means on the underside comprising of at least one overhanging flap (28), which flap is positioned above the free end of the first bar (6) when the cover member is in operating position. It is preferred that two overhanging flaps (28, 28a) be positioned above the free end of the first bar (6) when the cover member is in operating position. This will ensure that the actuator means always actuates the horizontal bar (6) when the depressable portion (26a) is pressed down.

The terminal end of the said flap (28) ends marginally above the upper surface of the first bar

(6). In this position a slight downward force applied at the free end of the depressable portion (26a) causes the overhanging flaps (28, 28a) to depress the free end of the first bar (6) which in turn depresses the second bar (10) to press down the nipple (14), thus releasing the aerosol contents. The aerosol contents thus released is directed out via the orifice (12) through the continuous passage (30) in the portion of the first bar and the second bar. When the downward pressure at the free end of the depressable portion (26a) is removed, the depressable portion returns to the equilibrium position. Similarly, the first bar (6) and the nipple return to their respective equilibrium position. The flow of the aerosol contents simultaneously stops owing to the design of the aerosol container (which is not the subject matter of this invention).

When the cover member is rotated to a seal position, the overhanging flap (28) is positioned above the shelf-like portions (23b) and removed from the free end of the first bar (6a). Any attempt to further depress the overhanging flap (28) will be resisted by the opposing structure of the shelf-like portion (23b).

Thus, the invention provides an easy to operate, economical cap body for use in association with aerosol containers. In practice, the cover member is fastened to the tubular body at the time of manufacture. The assembled cap body is snap-fastened to the aerosol cap. The terminal end of the second bar (10) fits over the nipple (14). The depressable portion (26) is rotated to an operating position at which position the overhanging flap (23) is directly above the free end of the first bar (6a). This position is advantageously market at the orifice and of the cover member. As explained, when the cover member is rotated to the operating position, the fin (24) in the cover member passes over the corresponding flap (20) on the tubular body, producing an audible sound to signal to the user that the cap body is now ready for use. Further, the position is also determined when the stopper (16) resists the rotational movements of the cover member by resisting the further movement of the lip. At the operating position, the free end of the depressable portion (26a) is depressed. According to the preferred configuration, the overhanging flap depresses the free end of the first bar (6a) causing the second bar (10) to depress the valve stem (14) thus causing the aerosol contents to be released (Fig. 5).

As described earlier when the downward force is removed, the component parts namely, the depressable portion (26), the first bar and the second bar returned to their equilibrium position. To bring the cap body to the sealed position, the cover member is now rotated in the opposite direction until further movement is restricted at the moment the stopper

(16) restricts the movement of the lip (32). This position is also indicated when the fin (24) passes over the flap (22), resulting in an audible sound. At such position the overhanging flap (28) is lies directly above the shelf-like portion (23a).

The cap body and the integral components are preferably made of plastics. To the extent not already indicated, it also will be understood by those of ordinary skilled in the art that any one of the various specific embodiments herein described and illustrated may be further modified to incorporate features shown in other of the specific embodiments, as desired.

The Invention in its broader aspects therefore is not limited to the specific embodiments herein shown and described but departures may be made therefrom within the scope of the accompanying claims, without departing from the principles of the invention and without sacrificing its chief advantages.

### Claims

1. A cap for aerosol containers and embodying a release mechanism, such cap comprising:-  
a tubular body (1) positioned to cover the ejection valve stem (14) of an aerosol container and having a diametrically positioned first bar (6) pivoted at a proximal end, and a second bar (10) connected to the first bar (6) and positioned and dimensioned to fit over a said valve stem (14), the two bars having a continuous passage (30) therethrough designed to permit flow of the contents of the aerosol container into an entrance of the second bar (10) and out through the proximal end of the first bar when the distal end (6a) of the first bar is depressed; and  
a cover member (2) rotatably mounted over the tubular body (1) and having a resilient means for engaging on the free end of the first bar in an operating position.
2. A cap body as claimed in claim 1, wherein the resilient means includes a depressible portion (26) pivotally mounted at one end and an actuator means on the underside at the free end of the said depressible portion to engage on the distal end (6a) of the first bar (6) in an operating position.
3. A cap body as claimed in claim 2, wherein the actuator means includes at least one column (28) perpendicular to the depressible portion and fastened to the underside of the depressible portion (26).
4. A cap body as claimed in any one of claims 1 to 3, wherein the tubular body (1) is provided with at least two spaced apart stops (16, 18), and wherein the cover member (2) includes a reciprocable abutment means so as to restrict the rotational movement of the cover member on the tubular body

within a predetermined angular range.

5. A cap body as claimed in claim 4, wherein, when the first stop (16) and the reciprocable abutment means are in mutual contact, the actuator is engaged on the distal end (6a) of the first bar (6), and when the second stop (18) and the reciprocable abutment means are in mutual contact, the actuator is disengaged from the distal end of the first bar.
10. 6. A cap body as claimed in claim 4 or 5, wherein the reciprocable abutment means includes a lip (32) projecting inwardly from the circumferential edge of the cover member adjacent to the free end of the depressible portion.
15. 7. A cap body according to any one of the preceding claims wherein the cap body includes means to indicate audibly the operating position of the actuator means.
20. 8. A cap body according to claim 7, wherein the indicating means also indicates audibly arrival of the cover member in a position corresponding to the inoperative position of the actuator means.
25. 9. A cap body according to claim 7 or 8, wherein the indicating means comprises two rigid flap projections (20, 22) spaced apart on the circumferential edge of the tubular body, and a corresponding rigid fin (24) projecting on the underside of the inner circumferential edge of the cover member, such that the fin (24) on the cover member passes over the flap on the tubular body at the moment the actuator means is at either the operating position or the inoperative position.
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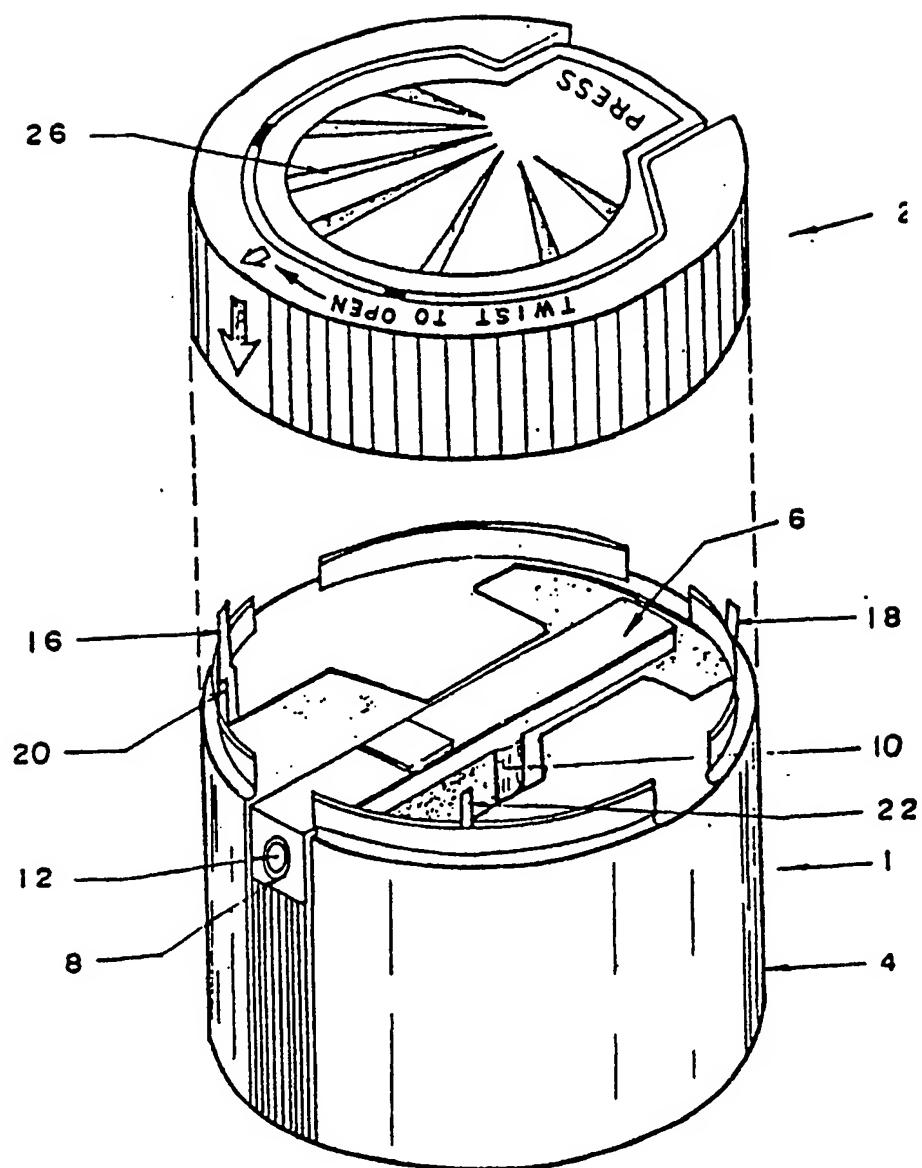


FIG. 1

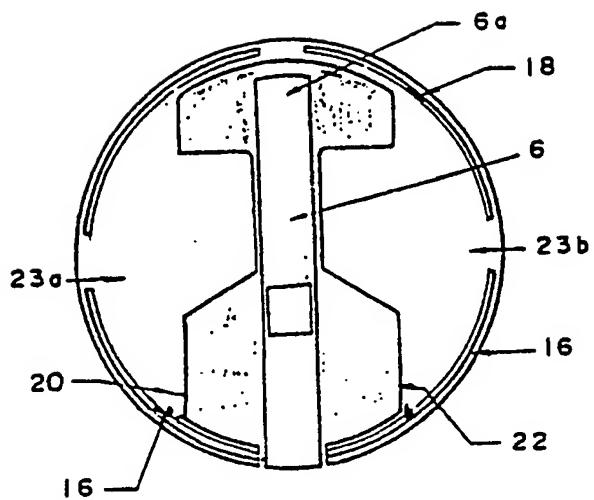


FIG. 2

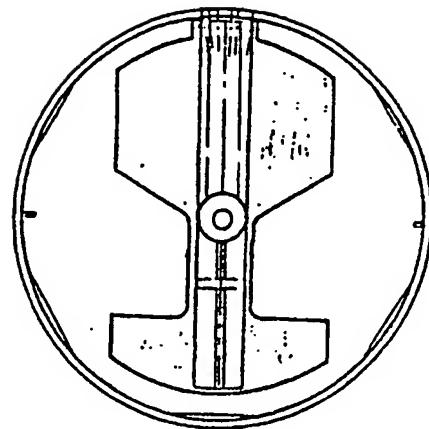


FIG. 2A

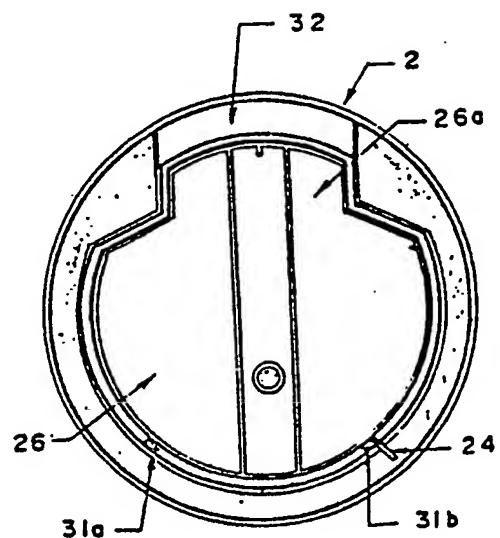


FIG. 3

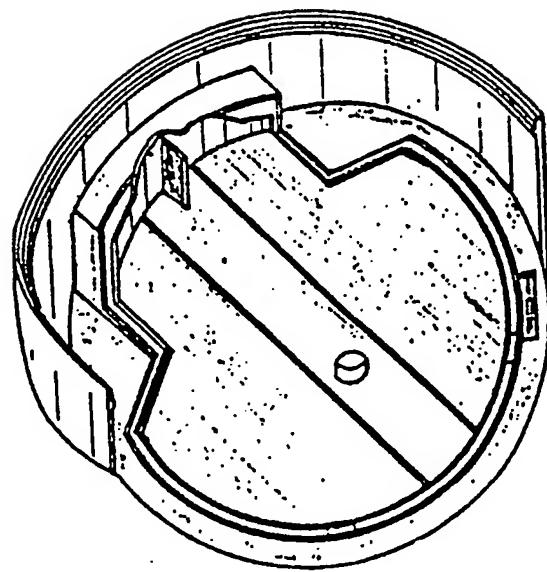


FIG. 4

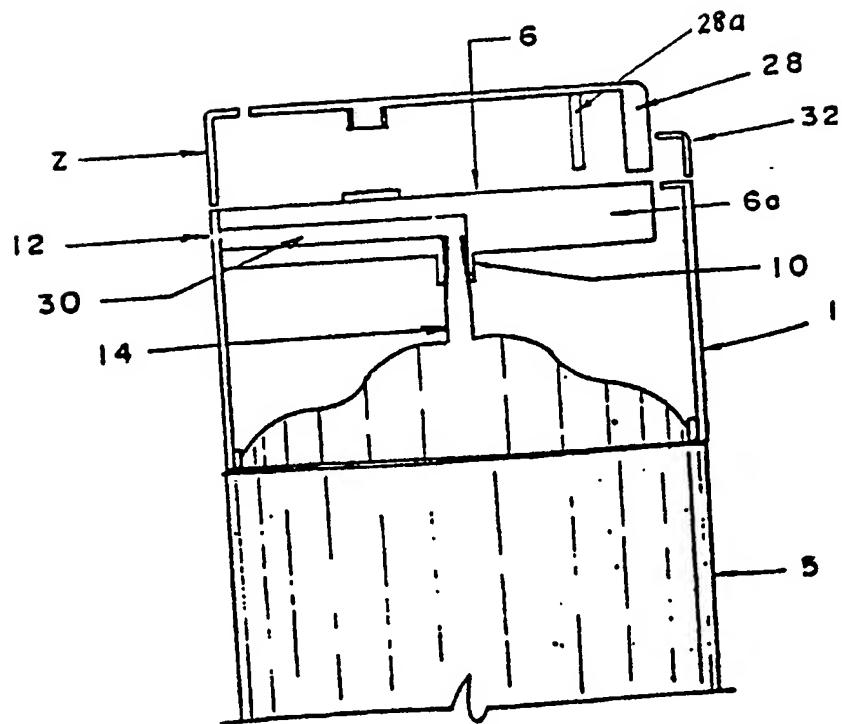


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number

EP 90 30 7678

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.5)			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim				
X	EP-A-0119084 (METAL BOX) * the whole document * ---	1-3	B65D83/14			
A	US-A-4324351 (MESHBERG) * abstract; figures 1-5 * ---	1, 4				
A	EP-A-0062256 (PRECISION VALVE CORPORATION) * page 3, lines 6 - 26 * * abstract; figures 1-4 * ---	1, 4, 7-9				
TECHNICAL FIELDS SEARCHED (Int. Cl.5)						
B65D						
<p>The present search report has been drawn up for all claims</p> <table border="1"> <tr> <td>Place of search BERLIN</td> <td>Date of completion of the search 26 OCTOBER 1990</td> <td>Examiner SPETTEL, J.D.M. L.</td> </tr> </table>				Place of search BERLIN	Date of completion of the search 26 OCTOBER 1990	Examiner SPETTEL, J.D.M. L.
Place of search BERLIN	Date of completion of the search 26 OCTOBER 1990	Examiner SPETTEL, J.D.M. L.				
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document				